

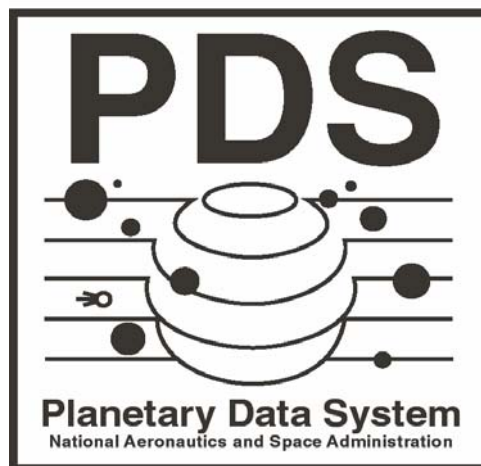
Planetary Data System

Release Description Document (RDD)

System Release D03.4

December 9, 2005

Version 1.0



Jet Propulsion Laboratory
Pasadena, California

CHANGE LOG

Revision	Date	Description	Author
0.050912	Sep 12, 2005	Initial draft.	R. Joyner, S. Kelly
0.051201	Dec 01, 2005	Formatted as an RDD including information on installation.	S. Hardman, J. Wang
1.0	Dec 09, 2005	Reformatted to move installation details into a separate Installation Guide.	S. Hardman, J. Wang

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1.0 INTRODUCTION

The Planetary Data System (PDS) Engineering Node (EN) is responsible for design, development and deployment of PDS system capabilities.

1.1 Purpose

The purpose of this document is to provide a description for the new or modified capabilities that comprise the current system release. This document will also describe any impact that the new or modified capabilities will have on the Discipline Nodes or the PDS user community.

1.2 Scope

This document covers the D03.4 system release, which is scheduled for deployment in December 2005.

1.3 Audience

This document is written primarily for those who will be impacted by the release described in this document. The expected audience includes:

- PDS Engineering Node (EN) Staff
- PDS Discipline Node Staff

1.4 Applicable Documents

[1] Planetary Data System (PDS) Installation and Verification System Release D03.4, Version 1.0, Dec. 9, 2005.

2.0 CAPABILITIES

This release includes a new capability for the administrative interfaces and a modified capability for the PDS search infrastructure.

2.1 Resource Manager

This release includes a new web application providing an administrative interface that allows authorized users to add, modify and delete resources associated with data sets in the PDS catalog database. The list of authorized users includes designated Discipline Node personnel as well as the EN operations staff. This new application will be included in the suite of current administrative interfaces, which includes the *Data Release Object Utility*, *Release Administrator* and *Release Manager*. This suite of applications will be linked from the Engineering Node site on the *Catalog Tools* page (<http://pds-engineering.jpl.nasa.gov/index.cfm?pid=48>).

The operational link for the *Resource Manager* application will be http://starbrite.jpl.nasa.gov/catalog_tools/. The following is a snapshot of the *Data Set List* page of this application that is displayed following a successful login:

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Planetary Data System
Engineering Node

Home Standards Tools Contact Us Feedback

Resource Manager - Data Set List [Help](#)

Enter filtering criteria for a concise search on Data Set ID/Name or select a Data Set ID from the list below to view the associated Resources.

Data Set ID: ARCB Data Set Name: Selection Reset Filter

Data Set ID	Data Set Name
ARCB-L-RTLS-3-70CM-V1.0	ARECIBO MOON RADIO TELESCOPE CALIBRATED 70 CM RADAR V1.0
ARCB-L-RTLS-4-70CM-V1.0	ARECIBO MOON RADIO TELESC RESAMPLED 70 CM RADAR MOSAIC V1.0
ARCB-L-RTLS-5-12.6CM-V1.0	ARECIBO MOON RADIO TELESCOPE DERIVED 12.6 CM RADAR V1.0
ARCB-V-RTLS-4-12.6CM-V1.0	ARECIBO VENUS RADIO TELESCOPE RESAMPLED 12.6 CM RADAR V1.0
ARCB/GSSR-M-RTLS-5-MODEL-V1.0	ARCB GSSR M RADIO TELESC DERIVED RADAR MODEL UNIT MAP V1.0

PDS Management Atmospheres Geosciences Imaging NAIF PPI Rings Small Bodies Engineering

FIRST GOV
Your First Click to the U.S. Government

+ Freedom of Information Act
+ NASA 2003 Strategic Plan
+ NASA Privacy Statement, Disclaimer, and Accessibility Certification
+ Copyright/Image Use Policy

NASA
Curator: Valerie L. Henderson
Webmaster: Maryia Sauchanka-Davis
NASA Official: William Knopf
Last Updated: 23 Nov 2005
+ Comments and Questions

The list of data sets in the graphic above has been filtered in order to fit in this document. A default instance of this page would display the entire list of data sets available in the PDS catalog database. Since this page will be linked from the EN site, the header and footer of the page have been formatted accordingly.

From the above page the user may select one of the data sets from the list, which will display a list of associated resources for the selected data set. The user may then choose to add a new resource or modify/delete an existing resource for the data set. A help page is also available for the application and can be displayed by selecting the *Help* button on any of the application's pages.

Since this is a new capability that will be installed only at the EN, its impact to the Discipline Nodes and the PDS user community is considered minimal.

2.2 PDS Data Distribution (PDS-D)

This release includes an upgrade to PDS-D, which will provide a faster and more robust environment for retrieving products via the PDS data distribution infrastructure. This will be accomplished by applying upgrades to the Object Oriented Data Technology (OODT) Profile and Product Server components utilized by the PDS.

The OODT Profile and Product Server components utilized by the PDS include support for multiple, concurrent-networking transports. At the time PDS adopted this technology, it included support for Common Object Request Broker Architecture (CORBA) and Java Remote Method Invocation (RMI) transports. PDS chose the Java RMI implementation since it required no external software packages and gave slightly better performance, however because the architecture behind the technology is flexible we could change our decision at any time without impacting servers or users (except for brief down time to switch over).

With RMI, the Product Servers are treated as remote Java objects, meaning:

- They register with a naming registry.
- They're queried by one of the web applications hosted on <http://starbrite.jpl.nasa.gov>.
- They respond by serializing blocks of data.

Using RMI has demonstrated a number of drawbacks:

- The naming registry is a point of failure. Even if servers are up and running, clients cannot locate them.
- Data cannot be streamed. The data must be sent one block at a time.
- The naming registry requires modifications to the security policy at multiple institutions.

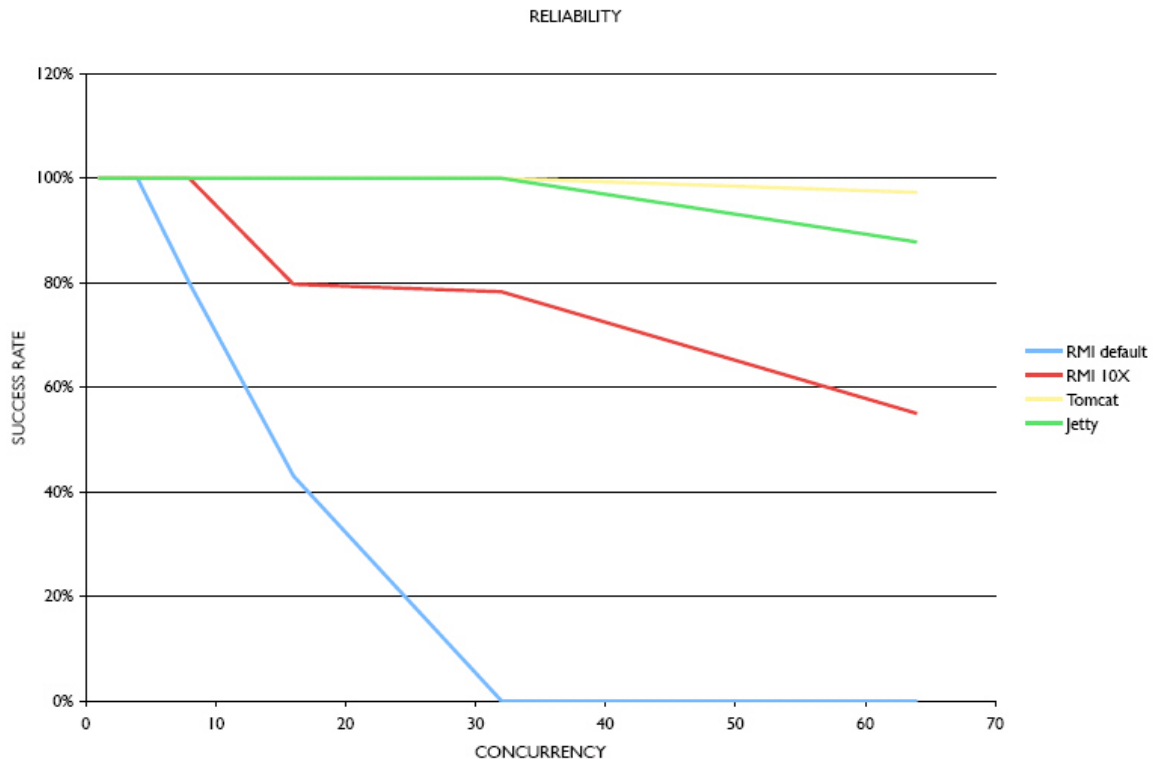
As a result of other partnership efforts at JPL, the OODT developers have released a version of the Profile and Product Server components, which support

Hypertext Transfer Protocol (HTTP) as a networking transport. This is the same HTTP used to power the World Wide Web. In preparation for this release, we tested HTTP versus RMI under a number of usage scenarios in a controlled environment to determine if migrating to HTTP would be beneficial to the PDS.

Replacing RMI with HTTP yields a number of improvements. HTTP-based Product Servers provide:

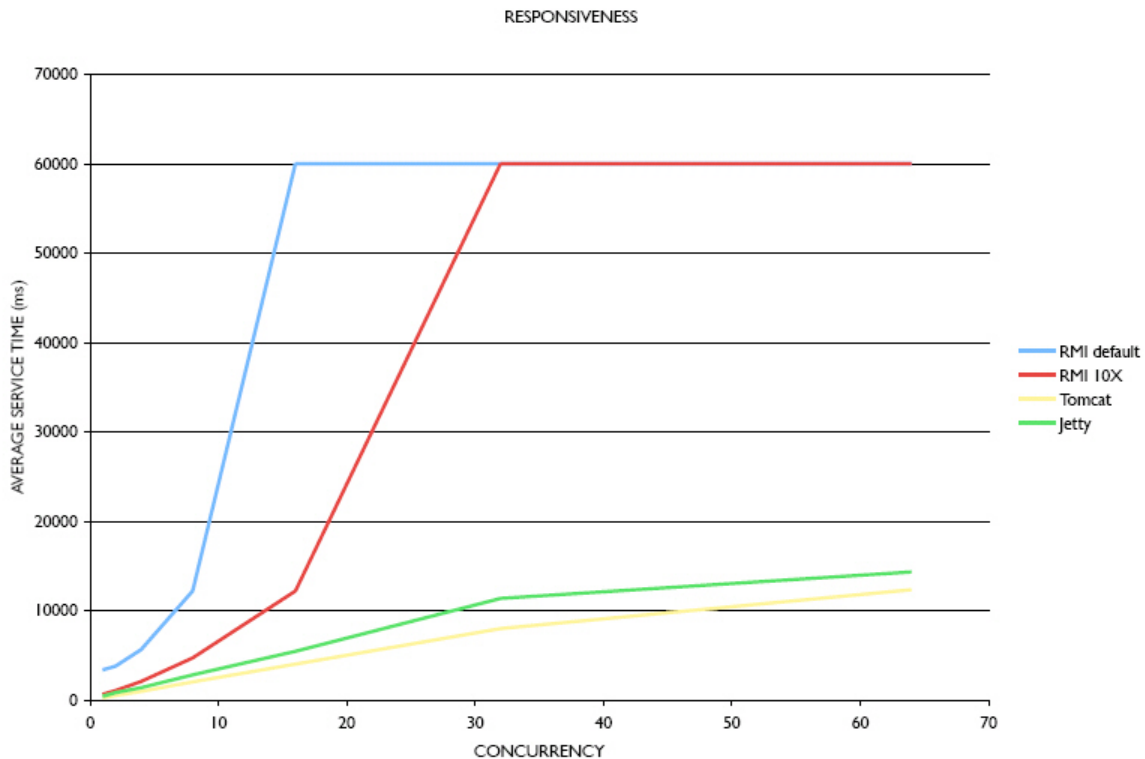
- Higher reliability
- Better performance
- Less administration

The test environment involved setting up parallel instances of the RMI-based Product Server and the HTTP-based Product Server on a Power Mac dual 2.0 GHz G5 system running Mac OS X. The client system, a Mac mini 1.42 GHz G4, then simulated users querying for PDS products, first 1 at a time, then 2 at a time, 4 at a time, 8, 16, and so forth. The test queries retrieved various kinds of PDS products (e.g., labels, zip archives, images, etc.) and measured the reliability of the responses (determining if queries completed in a reasonable time and resulted in correct data) as well as the speed of the responses. The RMI transport was compared with its default buffer size (which PDS is currently using) and at a 10-times larger buffer size. The HTTP transport was compared using two different application servers (Apache Tomcat and Jetty). The reliability results of the testing are depicted in the following chart:



The above chart depicts Product Server reliability during the test (higher numbers

are better). The server utilizing RMI transport with a default buffer size fails completely at 32 concurrent queries, while the server utilizing HTTP transport with the Tomcat application server is still servicing more than 90% of the queries at 64 concurrent users. The responsiveness results of the testing are depicted in the following chart:



The above chart depicts Product Server responsiveness during the test (lower numbers are better). The server utilizing RMI transport with a default buffer size takes nearly 60 seconds to complete a query when there are 16 concurrent users. The servers utilizing HTTP transport with Jetty and Tomcat perform much better, servicing queries in under 20 seconds even when there are 64 concurrent users.

Because of the improvements in both reliability and responsiveness, the EN has decided to move to the HTTP-based transport now available in the OODT Product Server component. The upgrade for the PDS Profile Servers will be performed in a later release.

Although components of the PDS-D infrastructure are installed and running at many of the Discipline Nodes as well as the EN, the impact from the initial deployment of this release is considered minimal. This is because the initial deployment will only involve upgrading the components at the EN. In addition, this release has no impact on current user interfaces:

- URLs to products remain the same:
<http://starbrite.jpl.nasa.gov/prod?object=...>

- Existing product and profile handlers do not need to be modified. This includes Node developed handlers.
- New software is backward compatible and will work with both RMI and HTTP Product Servers.

Once the PDS-D upgrade is up and running at the EN, a schedule for deployment at the participating Discipline Nodes will be negotiated.